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A Preliminary Bulletin
Concerning some
BEE DISEASES
in
INDIANA

June, 1909

Office of

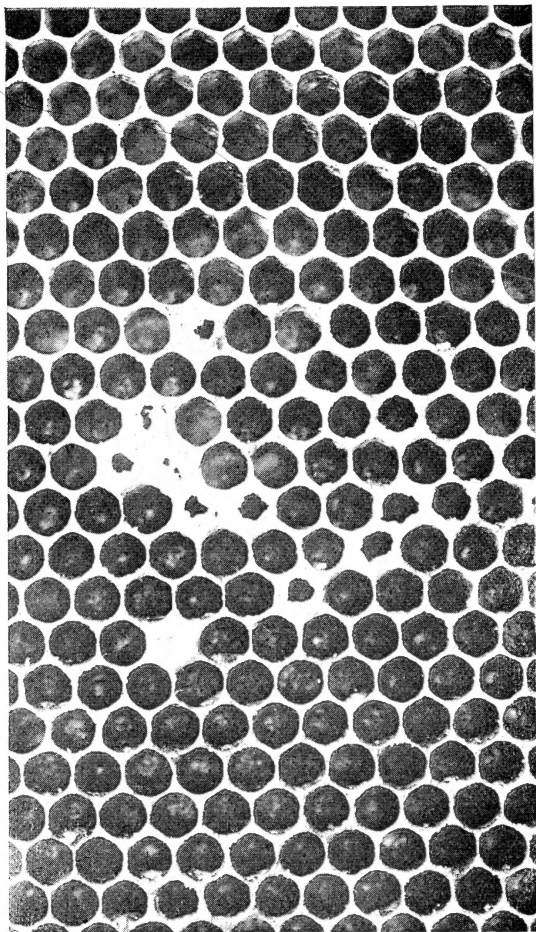
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A TYPICAL CASE OF AMERICAN FOUL BROOD.

Notice the perforated cappings and the small masses of unremoved material on the lower side of some of the cells. This material is what remains of the diseased larva.

APR 19 1910

BEE DISEASES.

This Bulletin is prepared as a preliminary statement concerning the present status of Bee diseases in Indiana.

Until a comparatively few years ago bees were thought to be almost entirely free from any form of disease, but recent investigations indicate that this idea is quite erroneous.

At present there are several diseases known to attack the domestic bee. Some of these disorders have been thoroughly studied and are well understood, while some of the others baffle our most careful investigations.

The two diseases which attract the most attention are known as American Foul Brood and European Foul Brood. The names do not refer to the origin of the disease but to the country in which the respective troubles were first worked out.

Both American and European Foul Brood are prevalent in Indiana, and during the past few years have been spreading with alarming rapidity.

In some localities hundreds of colonies of bees have been destroyed before the beekeepers realized the danger.

AMERICAN FOUL BROOD.

The American Foul Brood is that which has been known simply as Foul Brood. From investigations conducted by the Bureau of Entomology of the United States Government the cause of American Foul Brood was found to be a species of bacteria, *Bacillus Larvae*.

In diseased colonies the bees are usually not very active. Much of the brood fails to hatch.

The cappings of the infected cells are sunken and often have ragged perforations.

In American Foul Brood most of the cells containing diseased larvae are capped, and the larvae seem to die soon after the time of capping. If one of these diseased cells be opened the dead larvae may be seen lying on the lower side (not bottom) of the cell. Later it seems to melt down into a jelly-like mass of brownish color. If a pin or small stick be inserted in a dead larva and withdrawn the material stretches out in a fine thread or is "ropy." This characteristic is usually the final clinical test in the diagnosis of this disease. In the earlier stages the color of the dead material is best described as that of coffee diluted with milk, but later the color is dark brown, and finally the dead larva dries down to a mere dark scale which adheres firmly to the lower side of the cell.

The bees are seemingly unable to remove these scales. They may be seen in any comb that has contained Foul Brood by letting a strong light strike the lower side of the cells and looking into them at such an angle that the line of sight strikes the lower side of the cell about one-third of its depth. Each of these scales contains innumerable spores, each of which is capable of producing the disease in a healthy bee larva.

EUROPEAN FOUL BROOD.

European Foul Brood is the disease commonly known as "Black Brood," and is more difficult to positively diagnose than is the American disease. The cause of European Foul Brood is not known at the present time.

In European Foul Brood the larvae die earlier than in the American, most of them dying before the time of capping. The dead larvae are at first yellow in color, but grow darker until almost black.

The dried-down scales do not adhere firmly to the lower side of the cells, and are usually removed by the bees. Ropiness may be almost or entirely wanting.

It must be remembered that some colonies may be but slightly infected, having but few diseased cells, and apparently active and healthy. Such colonies are easily overlooked by those unaccustomed to the disease. During a heavy honey flow these mild cases may apparently disappear entirely.

TREATMENT.

The underlying principal of any treatment of either of these brood diseases is the complete separation of bees and infected material. The plan usually followed is the so-called McEvoy treatment which, given in Mr. McEvoy's own words, is as follows: "In the honey season, when the bees are gathering freely, remove the combs *in the evening* and shake the bees into their own hive; give them frames with comb foundation starters on and let them build comb for four days. The bees will make the starters into comb during the four days and store the diseased honey in them which they took with them from the old comb. Then in the evening of the fourth day take out the new combs and give them comb foundation to work out, and then the cure will be complete."

While Mr. McEvoy does not advise disinfecting the hives, it is always advisable to do so, as many cases of reinfection have been re-

ported when the bees were shaken into the same hive.

Hives may be rendered entirely safe for use again by charring the inside by means of a paint torch or by burning out with kerosene.

In incipient cases the cure will usually be complete without taking away the combs at the end of the four days. In such cases they may be shaken into a hive containing full sheets of foundation in the beginning.

If only one or two colonies are diseased the frames and combs should be burned or buried and the hives cleaned and charred. Care should be used in burning combs containing honey, as some of it might flow down into the ashes without being sufficiently heated to destroy the disease germs. The destruction of this material should not be put off until next day, but done during the night or before any bees fly the next day.

If there are several diseased colonies in the yard the healthy brood may be saved by treating the strongest colonies first and tiering up the brood on the weaker until most of it has hatched. If the queen of the weaker colony is killed when this brood is tiered upon it, there will be but little brood left unhatched at the end of the two weeks, when this queenless colony may be treated and given a queen, after which the combs may be destroyed.

If there be a large number of diseased colonies the combs may be rendered into wax, providing great care be taken in disinfecting all tools and utensils by boiling one hour, and the slumgum should be burned or buried.

In no case should diseased combs be rendered in a solar wax extractor as the heat may not be sufficient to destroy the spores.

All work with diseased colonies should be done after sundown or when the bees are not flying, and all infected material should be destroyed before next morning.

Great care should be taken with diseased honey, that no bees have access to it and thus carry the infection into clean hives.

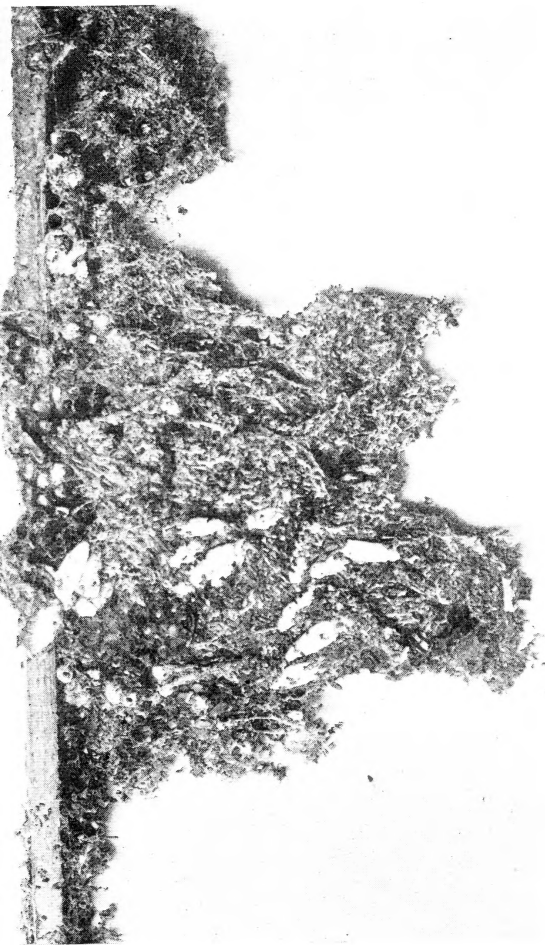
After handling a diseased colony the hands of the operator, as well as the tools and even the smoker, should be thoroughly disinfected before handling a healthy colony.

If a colony is known to be diseased it is never wise to try to winter it, as it is almost certain to die late in the winter or early in the spring, and the infected honey will be carried out by other bees before the owner knows the colony is dead.

In localities where Foul Brood is known to exist close watch should be kept, and if a colony dies during the winter the combs had best be removed and the hive treated as though diseased.

Colonies too weak in the spring to defend themselves should not be left a prey to robbers, and all work should be done in such a manner as to avoid robbing.

As a matter of self-preservation each beekeeper should look after infected material in the neighborhood and report any carelessness, for if the state is able to eradicate Foul Brood it must be largely through the co-operation of the beekeepers.



WORK OF THE BEE MOTH.

Notice how the comb has been eaten away and the remains covered with the webs of the moth.

BEE MOTH.

Very often we hear the expression from farmers that "they used to keep bees but the worms got in and ate them up." The "worm" referred to is the larva of the Bee Moth (*Galleria melonella*) and it is never to be found in a healthy, well-cared for colony. The moth is liable to invade the home of a weakened colony, and with the old type of box hive it may become an injurious pest. The newer types of frame hives leave no place of refuge for the young larvae, and the bees can readily defend themselves.

Invariably the presence of the Bee Moth is an evidence of careless work on the part of the beekeeper.

BEE LAWS.

The work of Apiary Inspection in Indiana is under the direction of the State Entomologist.

The following sections are from the law as passed by the Legislature of 1909:

Powers as to Apiaries.

Section 5. The state entomologist shall have full power and authority at his discretion to visit and examine any apiaries for the purpose of discovering whether or not any disease may exist among bees in any part of the state. When notified of the existence or the probable existence of foul brood or other contagious or infectious diseases among bees in any apiary in the state he shall visit and examine said apiary so reported and all other apiaries in the same neighborhood that he may be informed about by diligent inquiry or otherwise, for the purpose

of determining whether such disease exists or not. Whenever he shall be satisfied of the existence of foul brood or other diseases in their malignant form in any apiary, it shall be his duty to order all colonies so affected together with all hives occupied by them, and the contents of those hives and all tainted appurtenances that cannot be disinfected and that might cause the further spread of the disease to be immediately destroyed by fire under his personal supervision and care, but where said entomologist who shall be the sole judge thereof shall be satisfied that the disease exists in incipient stages, and is being or may be treated successfully, and he shall have reason to believe that it may be entirely cured, then he may in his discretion omit to destroy or order the destruction of the colonies or hives in which the disease exists. Whenever the disease shall be found to exist and the treatment for the same shall be ordered by the state entomologist he shall give to the owner or person in charge of the apiary instructions as to the manner of treatment of such apiary, and to see that such treatment be carried out, and should the said owner or person in charge of said apiary refuse or fail to carry out said instructions to the complete eradication of the disease or the satisfaction of the state entomologist, he shall destroy or order to be destroyed all said diseased colonies by fire as provided for in case of disease in its malignant form.

Transfer of Bees.

Section 6. The state entomologist shall have full power in his discretion to order any owner, possessor or person having charge of bees dwelling in box hives (having mere boxes without

frames) in apiaries where disease exists, to transfer such bees to movable frame hives, within a specified time, and in default of such transfer he shall order destroyed or destroy all such box hives and the bees dwelling therein.

Right to Enter Premises.

Section 7. The said state entomologist shall have the right to enter for the performance of his duties upon any premises where bees are kept.

Diseased Bees or Appliances. Penalty.

Section 9. Any owner of any apiary where disease exists or any person or persons, company or corporation who shall sell, barter or give away, or import into this state any colony or colonies of bees or appliances infected with disease, or expose to the danger of other bees any comb, honey or bee hives or appliances, or things infected with the disease, or conceal the fact that disease exists among his or their bees when disease is known to exist, or refuses to allow the state entomologist to inspect or treat any apiary or appliances or shall resist, hinder or impede him in any way in the discharge of his duties under the provisions of this act, shall be guilty of a misdemeanor and upon conviction shall be fined in any sum not less than ten dollars (\$10.00) nor more than twenty-five dollars (\$25.00).

Duties of Beekeepers.

Section 10. Every beekeeper or other person who is aware of the existence of Foul Brood or other infectious or contagious diseases either in his own apiary or elsewhere shall immedi-



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ately notify the state e
istence of such disease a
ing shall be guilty of a
conviction shall be fined in any sum not more
than ten dollars (\$10.00).

Section 13. The state entomologist shall have
the authority to employ such deputies and assist-
ants as the work of the office may require.



